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AUTHOR Adams, E. Kathleen
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ABSTRACT

The present research addresses three critical aspects of the municipal overburden question. Geographical differences in costs of providing public services are reflected by an index of input prices. The essential nature of noneducation services is measured by need-related characteristics of the school districts. Finally, the link between these essential noneducation costs and the levels of education expenditures is tested. The research leads to two conclusions pertinent to urban school districts. One, predicted levels of "essential" revenues for noneducation services, derived from their need-related characteristics, are substantially higher and have a larger range for city school districts. Two, higher levels of these revenues are generally associated with higher levels of per pupil education revenues, but this occurs at a much lower rate for city school districts than for other districts. The results do not substantiate a direct adjustment for municipal overburden in the New York school aid formula. They do highlight the need for research on the adequacy of aid programs for noneducational services and on the dynamic problems of large urban areas. (Author/IRT)

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Working Paper No. 29

MUNICIPAL OVERBURDEN: THE CONCEPT AND SOME NEW EVIDENCE

by

E. Kathleen Adams

Education Finance Center
Education Commission of the States
1860 Lincoln Street, Suite 300
Denver, Colorado 80295

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EXECUTIVE SUMMARY

The present research addresses three critical aspects of the municipal overburden question. Geographical differences in costs of providing public services are reflected by an index of input prices. The essential nature of noneducation services are measured by need-related characteristics of the school districts. Finally, the link between these essential noneducation costs and levels of education expenditures is tested.

Two results pertinent to urban schools are derived from this study. First, the predicted costs of essential noneducation services are substantially higher and have a larger range for New York's city school districts. Second, the effect of this pattern is that city districts do not increase the education portion of their local public sector at the same rate as other districts.

The results do not substantiate a direct adjustment for municipal overburden in the New York school aid formula. They do highlight the need for research on the adequacy of aid programs for noneducation services and dynamic problems of large urban areas.

INTRODUCTION

The intervenors in the New York Levittown court case brought forth sufficient evidence for the court to decide "municipal overburden" exists. Municipal overburden in the text of the decision denotes the following phenomenon: the cost of providing essential noneducational services caused a drain on local revenue, thereby reducing the amount of money available for educational purposes (p. 44). An even stronger statement is made: the higher noneducational expenditures in the cities are caused by the compelling, irresistible demands for municipal services that the urban environment and its characteristics create (p. 45).

Those statements describe what has been termed "municipal overburden" in the existing, albeit sparse, literature on the topic. Several components of this definition cause either confusion and/or disagreement. First, there is confusion, as well as incomplete research, due to an improper treatment of costs. Second, there is wide disagreement on what services are termed essential or needed and how to quantify these essential levels. Finally, there is little evidence that establishes a causality or link of any sort between essential municipal services and the levels of education expenditures across districts.

The present research has the advantage of integrating three separate analyses to address these issues in the most complete manner possible. The analysis of input price differentials (Wendling, 1980) and the allocation of tax revenues for noneducation services to all New York school districts (Miner and

Sacks, 1979) are combined in equations explaining the fiscal response of New York school districts (Adams, 1980).

The results in this report are based on a methodology that separates to a certain extent the issue of "cost overburden" from "municipal overburden" by analyzing only real, or cost adjusted, revenues, using the cost index that has been developed for New York. Furthermore, a working definition of essential services, based on new statistical analyses, is used in an effort to quantify this level for all school districts. The causal link between this level of essential services and education spending is tested by using it as an independent factor to explain variations in education revenues. Other refinements are included to test several issues raised by creative authors presently examining the "municipal overburden" question.

I. EXISTING LITERATURE

The distinction between "cost overburden" and "municipal overburden" is made perhaps more clearly in the text of the Levittown decision than in others. The court refers to the diminished value of the dollar allocated to city school purposes and notes that the reduced purchasing power of the urban education dollar is not accounted for by the school aid formula.

This correctly describes the fact that prices of inputs for education as well as municipal services are higher in large urban areas. This is one part of the cities' "cost problem." As Reischauer (1976) notes, not only are per unit costs of services higher, but also there is likely to be a need for higher service

levels in cities. That is, each unit costs more and more units are needed. Indeed, Reischauer feels that these needs may increase disproportionately. For instance, doubling the student body from low-income families may more than double the need for or cost of special education programs (1976, p. 296). The need for more units, though, are really cost effects from technological or production side problems. In New York, measures of input price differences exist for education services (Wendling, 1980) so the higher price of a unit can be included in a statistical analysis. The need for more education units can be approximated by using student need indicators. Similar variables are lacking, however, or municipal services (Knickman and Reschovsky, 1980).

A further complication may exist if Ladd (1976) is correct in describing the dynamic impact on costs of the cities' declining environment. She argues that, over time, it may be necessary to increase direct inputs just to maintain a level of public output due to such factors as increasing congestion (Ladd, 1975; Bradford and Oates, 1969). She also notes the influence of lagging productivity on rising wage costs in the public sector as a particular problem for cities. Baumol (1967, p. 423) actually contends that the lagging productivity in the public sector and existence of a growing public sector in urban areas inevitably leads to declining urban growth.

Addressing these technological and dynamic cost issues would require analysis far beyond the scope of the present research. It will be limited to an estimate of input price differentials, at one point in time, among New York school districts. This price

index does reflect relatively higher input prices for school districts that are coterminous or partially coterminous with urban areas. Although it is only meant to reflect price differences for education resources, it is assumed at one point in this analysis, that input prices for municipal services follow much the same pattern geographically.

Perhaps the most controversial aspect of "municipal overburden" is the description of municipal services as "essential," "needed," or "inexorable." A direct treatment of this issue is contained in an earlier study (Aiken and Auten, 1976) of the fiscal health of New York school districts. These authors present one methodology for separating "volitional" from "inexorable" service needs. Essentially, they argue that an essential bundle of municipal services can be defined for communities in the context of the behavior of a group of reference communities.

Their argument relies heavily on the Tiebout (1956) hypothesis which contends that people express preferences for local public goods by migrating to those communities which provide their desired level and mix of local public goods. Measuring "needed" services in terms of the population's demands is "in a sense measuring the level of services a community perceives as necessary to be competitive, given its size and the various socioeconomic characteristics of its population" (Aiken and Auten, p. 457).

Aiken and Auten estimate the empirical relationship of several school district characteristics which reflect "need,"

ability to pay and "tastes" to the levels of expenditures for municipal services. These estimates are then used to predict the level of municipal services that would be purchased in each community if its spending behavior, in response to its need-related characteristics, is average. This separates to a certain extent, the influences of local tastes and deviations from average ability to pay from "needs." This definition of needs and their methodology is used in the present analysis since it constitutes a workable procedure for testing the causality question.

There has been very little empirical work in New York or in other states that attempts to answer the question of whether noneducation expenditures affect education expenditures. If costs are appropriately treated, and some effort is made to identify "essential" services, is there an interaction between municipal and education services? One study which tested this link (Grubb and Michelson, 1974) argued that if a minimum expenditure on noneducation services is imposed, school expenditures may be less than the desired amount.

In a sense, the nonschool expenditures act as a constraint on the level of school expenditures chosen. When the above authors include noneducation revenues in an equation explaining school expenditures, the effect is negative. Only in large school districts, however, do nonschool expenditures seriously reduce school expenditures (Grubb and Michelson, p. 130). They conclude that in large school districts, school expenditures "may not be in equilibrium, but appear restricted by nonschool expenses which are

necessary for the maintenance of the district's integrity rather than expressive of local preferences" (1974, p. 130). As they note, many economists would argue with the idea that these districts are constrained; that actually their decision reflects a rational equilibrium position.

Another description of the constraint that may be placed on city school district choices is proffered by Gurwitz (1979). His conceptualization is dynamic in nature. The city is viewed as being able to raise a maximum amount of revenue over an indefinitely long time period; he calls this a "maximum sustainable revenue." In this sense, the total amount of revenue is fixed. It can obtain this maximum amount only by setting an "optimal" tax rate in any given period. If it sets a tax rate above this amount, an erosion of the future tax base is likely to occur such that the decreased future revenues actually exceed the extra revenues raised currently. As Knickman and Reschovsky (1980) note, Gurwitz "makes clear that educational and municipal finances come from a fixed pie which is much smaller than the total income of a local population" (p. 18). Knickman and Reschovsky argue that a behavioral relationship between municipalities and school districts exists regardless of political relationships because they share a common tax base whose resources are ultimately scarce (1976).

Regardless of why there is the expectation of this interaction, analyzing the "municipal overburden" hypothesis requires that this causal link be tested. The intent of this research is to test a very specific question: If costs are

accounted for by the relative price of inputs for education and "essential" noneducation revenues can be quantified, what is the link between these revenue levels and education expenditures per pupil?

II. NONEDUCATION REVENUES, DATA AND METHODOLOGY

Earlier research by several authors (Reschovsky and Knickman, 1976; Aiken and Auten, 1976; and Grubb and Michelson, 1974) establish consistent patterns between general socioeconomic variables and municipal expenditure levels. In general, concentrations of the poor, high crime rates and large, dense populations have been associated with higher expenditure levels. Grubb and Michelson note that the external factors which explain noneducation revenues lend support to the contention that "nonschool expenditures are less a function of preferences than of necessity" (p. 130). They found higher noneducation revenues associated with population, population density and the number of families receiving welfare. Communities with a faster population growth rate were found to spend relatively less on nonschool services which may reflect an inability to adjust service levels to changes in population.

Very similar results were found for expenditures in New Jersey communities (Reschovsky and Knickman, 1976). These authors used the results of their regression analysis to estimate a "minimum bundle" expenditure level, similar to the approach used

by Aiken and Auten (1976).* For urban areas in New Jersey, the average "minimum bundle" is 118 percent greater than the "average minimum bundle" in nonurban areas. The authors feel "urban-aid cities must spend an average of $295 per capita on necessities while nonurban-aid cities must spend $135" (p. 50).

The methodology used in the present research more closely follows that of Aiken and Auten (1976) in that average values of non-need related variables are used in estimating the "essential" amount of revenues per capita. Their study was more refined, however, in two aspects. Expenditure functions such as highways were estimated separately from education and other functions. Also, the dependent variable used to estimate the impact of need variables included aid received and spent for municipal services in the locality. Although their overall results are similar to other authors, there are different impacts of the need variables on individual functions. For instance, density of the population is associated with higher per capita expenditures for sanitation services but lower per capita expenses for highways. An ability to separate spending functions as well as lack of data on aid receipts cause some problems in the present analysis.

The data used in this research are for 1977 tax collections and were derived from various state sources. They constitute a rigorous allocation of total taxes raised by all taxing jurisdictions within a school district to the district residents

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*Knickman and Reschovsky use the minimum sample value of equalized valuation when creating the "minimum bundle" as opposed to the sample mean.

(Miner and Sacks, 1979). A second step in their allocation procedure was to estimate the portion of these taxes which are not exported; those which remain on residents as a tax burden. These nonexported tax burdens are used later in equations explaining education expenditures. Tax revenues before exporting are used in this step since they approximately indicate the expenditure levels of New York school districts for locally provided public services. A set of socioeconomic factors are used to explain their variation.

The results of the this part of analysis are given in the appendix (Tables 1 and 2). Although the total variation explained is not very high, the variables exert, in general, an expected impact on revenues/expenditures. Other specifications were tried which included population and population density. An unexpected negative relationship to spending levels was found. This may be due to poor population data (1970) and/or lack of data on intergovernmental aid received by communities for municipal services. The level of expenditures may be significantly underestimated, especially for urban areas, by the use of a dependent variable which is only local tax revenues. Other need related variables did give reasonable results.

The statistics in Table 1 indicate the responsiveness of local tax revenues to socioeconomic factors, such as crime rate. A 10 percent difference in this rate indicates approximately $8 of additional revenues per capita is raised. There is also a positive relationship found between spending levels and percentage

of students whose parents are on welfare* (see Tables 1 and 2).

Other need related variables included in the equation are rate of population growth, percent minority student population and density of property value. This last variable is somewhat of a "catch-all" factor for densely populated areas. It is feasible that this variable would identify densely populated urban areas with concomitant ageing housing and large business sectors, as being in "need" of higher service levels in many areas. Aiken and Auten use percentage commercial property value, percentage old housing and population density to explain needed service levels of public safety (p. 459). In the present sample, density of property value is highly correlated with population density (.79) and, perhaps reflects the set of environmental factors associated with congested urban areas. In the present results, a $1,000 difference in this variable is associated with an additional $21 per capita in revenues for noneducation services.

Another interesting result on the need related factors is that of the population growth rate. The negative relationship is consistent with Grubb and Michelson's finding for Massachusetts. As they note, it may reflect a lag in adjusting service levels to population and may also represent another dimension of those towns and cities which are stagnant in terms of population growth --

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*This is a current data item derived from state sources. Census (1970) data on the percentage of families in poverty did not perform well in the equations.

generally central cities and their inner suburbs -- and which require large per capita expenditures for highways, police and fire protection" (p. 130). This is consistent with Ladd's hypothesis and concern with the dynamic aspects of city problems, as well as Gerwitz's. Further research of these "over-time" concerns is warranted.

Although the need related variables are the focus of the analysis in this section, it is interesting to note the effects of several wealth and taste related factors. As is the case for education expenditures, those districts with higher income levels raise more revenues for other services. An additional $10 per capita is associated with $1,000 differences in income per return of district residents. The findings are extremely similar to those for education expenditures (Adams, 1980). The median years of schooling of the adult population also exhibits a strong positive relation to public spending in these areas. Results on the price effects of the relative price index* and tax base composition are negative, as expected.**

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*As noted, the price index used here was developed to reflect relative prices of education resources. Use of this index here is appropriate only if input prices for other public services move in the same direction.

**The elasticity coefficient on the relative price variable is inordinately large. In dollar terms, however, it implies approximately $17 less inputs are purchased for a one percent difference in this relative price, all other factors held equal. The tax base composition appears to exert a price effect due to perceived exporting of property and sales taxes.

The specifications in Tables 1 and 2 were used to generate the "essential" amount of noneducation revenues in local school districts. Operationally this is done by using statewide average values of the non-need related variable and actual district values on the need related variables in conjunction with the regression equation coefficients to predict a level of tax revenues per capita.* Conceptually, this dollar value represents what the district would raise if it had average non-need related characteristics and raised revenues in response to its need related characteristics in an average "behavioral" manner. In a sense it identifies the portion of actual revenues which could be termed "essential" or "needed" to maintain the district's public services at a competitive level.

Predicted "essential" revenues /capita

$$= -2.582 + .236\ (\overline{\text{pupils/capita}})$$
$$+ .376\ (\overline{\text{income/return}}) + .920\ (\overline{\text{years of schooling}})$$
$$- 4.740\ (\overline{\text{relative prices}}) - .193\ (\overline{\text{tax base composition}})$$
$$- .023\ (\text{population growth}_i) + .202\ (\text{crime}_i)$$
$$+ .118\ (\text{percent parents on welfare}_i)$$
$$+ .169\ (\text{density of property value}_i)$$

*Since the equations were fit in double-log, the actual prediction of the revenues used the log-form of the variables. In purpose of exposition, they are written in ordinary terms below.

Whereas the actual value of real* noneducation revenues per capita ranges from $46 to $2,281 dollars, the amount of "essential" revenues ranges from $152 to $1,280 per capita. Recall that actual expenditures are most likely different from either of these figures due to the receipt of state and federal aid.** Yet, the predicted "essential" values can be different from any actual figures since they are hypothetical in nature. They constitute the amount of revenues raised "as if" the district had average non-need related characteristics and "as if" they responded to need in an average manner.

The value of these "essential" revenues for the city school districts are higher on average and exhibit a larger variation. The mean value for noncity districts (using results in Table 1) is $323 per capita. This is in contrast to a mean predicted level for city districts of $439 per capita, approximately 36 percent greater. For noncity districts the range is from a minimum of $152 to $779 per capita. The comparable range for city districts is from $220 of "essential" revenues per capita to $1,280 per capita; the range is almost twice as large.***

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*The dollar values have been deflated using the cost-of-education inputs index (Wendling, 1980). This is necessary since the analysis of education expenditures is in real terms.

**Lack of good population data also can make these data different from actual per capita expenditures.

***The mean values and range of predicted "essential" revenues from the equation in Table 2 exhibit the same pattern but are much more dramatic. They are also tested in the education expenditure equations and exhibit similar results.

The second part of the analysis uses these values of predicted "essential" revenues in an equation explaining total and locally financed per pupil school revenues. It tests for the causal link between levels of essential municipal or noneducation services and the level of education services provided. The analysis also uses tax burden measures developed by Miner and Sacks as predictors in separate equations.

III. ANALYSIS OF EDUCATION REVENUES

The equations used to explain education revenues per pupil in New York school districts have yielded reasonable and consistent results (Adams, 1980). The inclusion of noneducation revenues does not significantly alter previous coefficient measures. In most equations the explanatory power is slightly increased.

The focus in the present equations (Tables 3 through 5) is the coefficient on "essential" noneducation revenues (Tables 3 and 4) and/or noneducation tax burdens (Table 5). The equation in Table 4 includes only those city districts which rely heavily on property taxes (> 50 percent of total revenue) and estimates "essential" revenues using the statistical results presented in Table 2. The use of noneducation tax burdens, either before or after exporting, is one means of testing the municipal overburden question. In Table 5 the noneducation tax burdens include only nonexported taxes.

The available data are rich in conceptual as well as empirical terms. An estimate of the nonexported dollar amount of tax revenues for noneducation services paid by district residents

was provided by Miner and Sacks.* The burden these revenues place on district residents is measured as a tax rate relative to residential and apartment value only. The pattern of this tax burden, as well as the burden before exporting of taxes, shows that city districts have relatively larger burdens. This is somewhat surprising since cities have a larger capacity to export taxes via their commercial/industrial tax bases. The tax burden for noneducation services after exporting on city residents appears to remain high.

The results in Table 5 indicate that the level of this tax burden has a small and positive impact on school expenditures. It appears that local public expenditures move together. Even with higher locally borne noneducation taxes, districts appear to raise additional total revenues for school spending. The coefficients in the local revenue equation are also positive, but not statistically significant. This is an indication that total revenue, which includes dollars of aid, exhibits a different pattern than revenues raised and borne locally.

For these nonschool tax burdens as well as both measures of "essential" noneducation revenues (Tables 3 and 4), this positive association is slightly lower for city school districts. The finding that these revenues move together may indicate individuals view some local public goods as complementary rather than

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*This reflects an effort to enumerate all sources of tax exportability (property and sales taxes) and quantification of that effect.

substitutive; more education services complement additional safety, health and sanitation services in local communities. The only difference for city districts is that this positive association is not as strong. Their education expenditures per pupil do not increase as much as other districts when additional spending on other public services increases.

A dollar example derived from the results in Table 3 indicates the magnitude of this differential. Every $100 of "essential" revenues perceived as needed for noneducation services is associated with $147 additional locally financed education expenditures at the sample mean.*

For city districts which have higher perceived "essential" revenues, this relationship is only $92 additional local dollars for education services per pupil. This may indicate that, over time, city school districts are neither willing nor able to expand their mix of education and noneducation services in the same manner as other school districts.

The equations presented in Table 4 further differentiate the city districts. Only those school districts associated with cities which rely on property taxes for more than 50 percent of their total tax revenues are included in this city group (dummy variable). Another difference is the use of equations in Table 2 to predict "essential" revenues; those results indicate dramatically higher needs for city school districts.

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*This dollar example uses the estimated elasticity coefficient and mean values of noneducation revenues.

Again, the relationship of these "essential" revenues and per pupil locally raised revenues is positive; the coefficient for city districts is significantly lower. These coefficients imply that districts which are not located in cities and rely heavily on property taxes, raise approximately $31 more per pupil with every $100 of "essential" noneducation revenues. The particular city districts identified in these equations raise only $4 more with $100 differences in perceived "essential" revenues. This finding is consistent with the research on the impact of constitutional tax limits for cities which indicated some fiscal interaction for districts which overlay cities that rely heavily on property taxes (Hickam, 1980).

A final question and testing of the link between education and noneducation spending concerns the growth of the school district's tax base. Is the "fixed" amount of revenues in the long run, as described by Gurwitz (1979), perceived by residents in areas with declining tax bases? If the tax base is not growing at an acceptable rate, residents and district managers may feel that tradeoffs must be made in the public sector. A thorough testing would require time series data and analysis. The present analysis used a dummy variable to reflect those districts with growth in their full property value of less than five percent a year over a five-year time period (1973-1978). The results show that the relationship between local education revenues per pupil and "essential" noneducation revenues is still positive for these particular districts. Indeed, there is no significant difference in the coefficient, from the average, for these districts.

The results on other variables in the equations are very consistent in sign, and in many instances, the magnitude with earlier results. Previous conclusions with regard to property wealth, income and price effects remain intact (Adams, 1979).

The equations presented in Tables 3 and 4 are somewhat different in that the price effects of the relative price index, tax base composition and pupils per capita are allowed to vary. The cost-of-education inputs continues to exhibit a significant relationship (negative) to expenditure levels chosen.

The present findings do not confirm the common notion of "municipal overburden." There is not a negative relationship between levels of education spending and levels of noneducation revenues. This is a robust finding over the present equation specifications, whether noneducation revenues are reflected as an actual tax burden, or whether only "essential" tax revenues are measured.

Yet the results suggest that a behavioral difference does exist for school districts located in urban areas. The implication is that they do not increase the education portion of their local public sector at the same rate as other districts. This implies some difference in the tradeoffs made by school district residents residing in these areas. A dynamic analysis could shed more light on the effects of this behavior over time.

IV. CONCLUSIONS AND POLICY IMPLICATIONS

The present research and that of others involved in the New York project has examined several aspects of urban school

districts. Their findings confirm many intuitive feelings about the problems of public schools located in urban, and perhaps deteriorating, environments.

At any point in time they face relatively higher input prices for education resources than other districts. They have lower than average resident income levels and larger numbers of special need pupils. Furthermore, they face higher levels of noneducation tax burdens, before and after exporting of taxes is accounted for.

The present research leads to two further conclusions pertinent to urban school districts.

- Predicted levels of "essential" revenues for noneducation services, derived from their need-related characteristics, are substantially higher and have a larger range for city school districts.
- Higher levels of these revenues are generally associated with higher levels of per pupil education revenues but at a lower rate for city school districts.

The present results do not confirm the expected negative impact of municipal spending on education.*

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*It should be noted that the data could be improved in two respects and more sophisticated statistical techniques may be called for. First, the procedure used by Miner and Sacks for allocating some of the tax revenues to local school districts is appropriate for measuring tax burdens but may not be the most appropriate for measuring needed service levels. Second, the lack of data on aid receipts by local districts may understate needed revenue levels in many local areas. Finally, since noneducation revenues and education revenues may be simultaneously determined, the most appropriate statistical methods would include a simultaneous equations model. This is produced with direct inputs such as policemen and patrol cars plus the environment in which they work such as the density of population. This explains why, over time, it may be necessary to increase direct inputs just to maintain the same level of desired output (Ladd, 1976). Given that city areas face higher input prices (Wendling, 1980; Bahl, Gustely and Wasylenko, 1978) at any one point in time, it becomes apparent they may face cumulative cost impacts over time which are very significant.

The findings, however, of higher "essential" revenue levels for city districts and the differential rate at which city districts expand education versus noneducation services do imply some type of "overburden," this "overburden" highlights more a municipal finance inequity rather than a school finance inequity.

It seems crucial to separate the dynamic relationship of the urban environment to the production of, and demand for, urban public services. On the production side, it is intuitive that additional population in a dense, congested environment may increase the amount of inputs needed to provide a public service to a much greater extent than additional populations in less congested environments. As Ladd argues, residents desire a certain output from public services such as security from crime.

Several authors have linked this production cost problem to the inability of city areas to maintain adequate growth (Baumol, 1967; Reischauer, 1976). Indeed, Gurwitz' work associates city tax policy with their growth pattern and, ultimately, their fiscal health (1979). Gurwitz argues that "optimal" tax rates can be defined for urban areas. They are optimal in the sense that they maintain the growth of the local urban economy. It is important, however, to identify the source of pressures behind the "nonoptimal" tax policies followed by city areas. If they are due to inevitable, cumulative supply side problems, that is a very different policy issue than a poor perception of resident demand for public services by city managers.

Another policy issue which the present findings illuminate is a further diversification of revenue sources for city areas.

Inman notes that as total taxes rise in a city area, the share of revenues raised through the local property tax increases (1979). When offered the chance to diversify tax sources, dramatic decreases in the property tax share occur. Inman feels that "to reduce the direct burden of local property taxes in large U.S. cities, the best strategy is to allow cities with limited tax access to use other tax instruments" (1979, p. 164). The present findings indicate that the differential behavior of city districts is more acute in city areas which rely heavily on property tax revenues. If the present results are interpreted as fiscal interaction between city services and school spending, it is more apparent in those cities competing for property tax revenues.

In terms of imminent policy recommendations, the findings do not suggest the need for a "municipal overburden" factor in the school aid formulas. The adjustments previously recommended adequately account for city problems substantiated by present research. The lower average level of current resident income, the higher concentration of special need pupils, and the relatively higher input prices geographically can be neutralized by an income factor, pupil weights and adjustment by a cost-of-education inputs index.

This does not deny that the dynamic aspects of production problems and the differential rate at which cities appear to expand public school services does not deserve further attention. In conjunction with any further research, it is crucial that the response of fiscally stressed cities and/or city school districts be explored. Of particular interest is the repercussions on

either local government (school district or city) when the other one is aided by state or federal entities. Much earlier research (Weicher, 1970) indicates either government can be aided and the other will receive secondary benefits! A final question is the differential response of city school districts to the receipt of school aid, relative to other districts. As Knickman and Reschovsky note, "there is a paucity of research that focuses explicitly on how fiscally stressed cities respond to grants-in-aid" (1980, p. 26). If the goal of the state is to increase education spending in city areas, it is crucial to know if they respond differently than the average district to the receipt of such aid. Analysis of New York school districts indicates cities may provide less tax relief, over time, relative to other districts, as they receive aid (Adams, 1980).

The following conclusions/policy recommendations can be made at this time:

- The research results show that noneducation spending does not negatively affect school spending and thus does not provide substantive support for a direct adjustment for "municipal overburden" in the New York state school aid formula; the results continue to justify adjustments for differing income levels, relative costs and pupil need.
- There is a need for exploring the dynamic, long-run aspects of both production/supply-side problems as well as possible interaction between education and noneducation services on the demand side in city areas.
- A viable policy option to alleviate fiscal interaction of city and school district governmental units is a diversification of tax revenue sources available to cities.
- The adequacy of aid programs to cities for noneducation services should be examined; further research on the repercussions on school district spending with the receipt of such aid by the city is also needed.

APPENDIX

STATISTICAL EQUATIONS

Table 1

DETERMINANTS OF NONEDUCATION TAX REVENUES
IN NEW YORK SCHOOL DISTRICTS

(cost-adjusted dollars)[a]

Non-need Related Variables	Elasticity Coefficient[b]
Pupils per capita	0.236*
New York gross income per return (adjusted $/number of returns)	0.376*
Median years of schooling	0.920*
Relative Price Index (Price of education inputs/ general cost of living)	-4.740*
Tax base composition (Percentage residential and apartment property value)	-0.193*
Need Related Variables	
Percent minority student population	-0.005 N.S.
Crime rate	0.202*
Population growth rate	-0.023*
Percentage students' parents on welfare	0.118*
Density of property value	0.169*
Intercept	-2.582
Downstate Intercept	-2.336

Summary Statistics

R^2 = .54
S.E.E. = .3325
N = 690

[a]Dollar values have been deflated by cost-of-education inputs index.

[b]All variables are in log-form. Coefficients therefore represent elasticities.

* = statistical significance at the .01 level of confidence.
N.S. = not statistically significant.

Table 2

DETERMINANTS OF NONEDUCATION TAX REVENUES
IN NEW YORK SCHOOL DISTRICTS

(cost-adjusted dollars)[a]

Non-need Related Variables	Noncity Elasticity Coefficient[b]	City Elasticity Coefficient[c]
Pupils per capita	0.234*	
New York gross income per return (adjusted $/number of returns)	0.405*	
Median years of schooling	0.893*	
Relative price Index (Price of education inputs/ general cost-of-living)	-4.576*	
Tax base composition (percent residential property value)	-0.318*	
Need-related Variables		
Percent minority student population	-0.003 N.S.	-0.003 N.S.
Crime rate (number of crimes/population)	0.209*	-0.028*
Population growth rate	-0.023*	
Percentage students' parents on welfare	0.109*	-0.038 N.S.
Density of property values	0.174*	
Intercept	-2.383	-1.561*
Downstate Intercept	-2.239	
Summary Statistics		
R^2 = .56		
S.E.E. = .3268		
N = 690		

[a]Dollar values have been deflated by cost-of-education inputs index.

[b]All variables are in log-form. Coefficients therefore represent elasticities.

[c]Interaction dummies were included to test for differences in the coefficients for city school districts.

* = Statistical significance at the .01 level of confidence.
N.S. = not statistically significant.

Table 3

DETERMINANTS OF TOTAL AND LOCAL PER PUPIL REVENUES
FOR NEW YORK SCHOOL DISTRICTS
(cost-adjusted dollars)

Variable	Total Revenues Estimated Coefficient	Local Revenues Estimated Coefficient
Operating aid per pupil (adjusted $/combined adjusted ADM)	0.054*	0.546*
State categorical aid per pupil (adjusted $/combined adjusted ADM)	0.108*	0.086*
Federal revenue per pupil (adjusted $/combined adjusted ADM)	0.013*	0.010**
Residential market value per pupil (adjusted $/combined adjusted ADM)	0.224*	0.553*
New York gross income per return (adjusted $/combined adjusted ADM)	0.237*	0.095*
Tax base composition (percentage residential property value)	-0.269*	-0.577
Relative price index (cost-of-education inputs/cost-of-living index)	-1.368*	-0.950*
Pupils per capita	-0.019 N.S.	-0.012 N.S.
Pupil growth rate	-0.093	-0.122*
Median years of schooling	0.018	0.695*
Ratio of nonpublic to public enrollments	-0.004**	-0.002 N.S.
Level of "essential" revenues per capita (predicted adjusted $/capita)	0.203*	0.410*
"Essential" revenues per capita in city districts (interaction dummy variable: 1 - city district; 0 - noncity district)	0.199*	0.399*
Intercept	2.142	1.894
Summary Statistics		
R^2 =	.76	.89
S.E.E. =	.1026	.2023
N = 690		

* = statistical significance at 0.01 level.
** = statistical significance at 0.05 level.
N.S. = not statistically significant.

Table 4

DETERMINANTS OF TOTAL AND LOCAL PER PUPIL REVENUES
FOR NEW YORK SCHOOL DISTRICTS
(cost-adjusted dollars)

Variable	Total Revenues Estimated Coefficient	Local Revenues Estimated Coefficient
Operating aid per pupil (adjusted $/combined adjusted ADM)	-0.012 N.S.	-0.679*
State categorical aid per pupil (adjusted $/combined adjusted ADM)	0.100*	0.071*
Federal revenues per pupil (adjusted $/combined adjusted ADM)	0.012*	0.006 N.S.
Residential market value per pupil (adjusted $/combined adjusted ADM)	0.232*	0.571*
New York gross income per return (adjusted $/number of returns)	0.256*	0.133*
Tax base composition (percentage residential property value)	-0.248*	-0.533*
Relative price index (cost-of-education inputs/cost-of-living index)	-1.212*	-0.649*
Pupils per capita	-0.009 N.S.	0.011 N.S.
Pupil growth rate	-0.118*	-0.172*
Median years of schooling	0.007 N.S.	0.665*
Ratio of nonpublic to public enrollments	-0.000 N.S.	0.005 N.S.
Level of "essential" revenues per capita (predicted adjusted $/capita)	0.069*	0.142*
"Essential" revenues per capita in select city districts[a] (interaction dummy variable: 1 - city district; 0 - noncity district)	0.055*	0.111*
Summary Statistics		
R^2 =	.73	.88
S.E.E. =	.1086	.2147
N = 690		

[a]City districts included in this group are those whose municipal governments rely on property taxes for more than 50 percent of their total tax revenues.

* = statistical significance at 0.01 level.
N.S. = not statistically significant.

Table 5

DETERMINANTS OF TOTAL AND LOCAL PER PUPIL REVENUES
FOR NEW YORK SCHOOL DISTRICTS
(cost-adjusted dollars)

Variable	Total Revenues Estimated Coefficient	Local Revenues Estimated Coefficient
Operating aid per pupil (adjusted $/combined adjusted ADM)	0.035*	-0.775*
State categorical aid per pupil (adjusted $/combined adjusted ADM)	0.092*	0.060*
Federal revenue per pupil (adjusted $/combined adjusted ADM)	0.013*	0.007
Residential market value per pupil (adjusted $/combined adjusted ADM)	0.293*	0.570
New York gross income per capita (adjusted $/estimated population)	0.250*	0.232*
Generalized tax price (percentage residential times relative price index times pupils per capita)	-0.314*	-0.499*
Pupils per capita	0.257*	0.494*
Pupil growth rate	-0.125*	-0.203*
Median years of schooling		
Ratio of nonpublic to public enrollment	-0.001	0.012*
Nonschool tax burden (nonschool taxes/residential and apartment value)	0.036*	0.040 N.S.
Nonschool tax burden in city districts (interaction dummy variable: 1 - city district; 0 - noncity district)	0.027*	0.040 N.S.
Intercept	2.939	6.067
Summary Statistics		
R^2 =	.72	.87
S.E.E. =	.1122	.2220
N = 690		

* = statistical significance at 0.01 level.
N.S. - not statistically significant.

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